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Patterns and Risk Factors of Congenital Heart Disease among Children under Five Years in Pediatric Teaching Hospitals at Mosul City

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ABSTRACT

Background: the Congenital heart defect is a birth disease that direct affects the normal growth and development function of the heart due to defects in the structure of the heart after delivery . This disease therefore a structural abnormal of the heart and large vessels, which occurs during birth. **Aim and objectives:** The study aimed to assess the types, patterns and risk factors of congenital heart disease among children under five years in pediatric teaching hospitals at Mosul city. **Method:** The current study was based on a quantitative descriptive design of case-control studies, which were conducted on a sample containing size of potential non-probability samples (case n=90) and another group considered as control (control n=90) were selected from the cardiac medicine and surgical center in three teaching pediatric hospitals in Mosul city during the period (10th April 2023 to 10th Oct. 2023). **Results:** The results of the study show that more than half of the study samples were male 54.4% and 45.6% female, the study shows that the majority of the study samples were 75.6% under the age of 2 years, while 24.4% were 2 to 5 years old. The current study showed that almost two thirds of the mother in the study group had a health condition during pregnancy, such as diabetes, hypertension, rubella infection, and UTI. **Conclusions and Recommendations:** The study revealed that the most common CHD among the participants was a ventricular and ventricular septal defect, patent ventricular arteries, and lung valve stenosis, whereas the Fallot tetralogy and transposition of large vessels were the categories of this diseases.

1. Introduction

Birth defects caused by anatomical abnormalities of the heart that interfere with the heart's normal development and function from birth are referred to as congenital heart disease (CHD). Accordingly, CHD is an anatomical heart defect and/or major arteries that is present from birth (Hoffman, 2013). Congenital heart defects can affect the walls of the heart, valves, or blood vessels that supply the heart with nutrition and oxygen. These congenital heart defects vary depending on the site of the effect, from simple and asymptomatic symptoms to complex disorders with symptoms that can sometimes lead to death (Cucu and Chifiriuc, 2018). Cyanotic heart disease (CHD) is

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characterized by cyanotic and non-cyanotic heart disease by the cyanosis of the extremities and lips when the blood ischemia is severe. [1].
Blue discoloration of the body skin, finger nails, and lips, tachypnea, increased heart rate, legs edema , stomach, and/or under the eyes, difficulty breath during feeding, weight loss, tired fatigue and exhaustion during daily activities or sports, swelling of the joints during exercise, and swelling of the hand, knee, or foot are all common symptoms of congenital heart disease (CHD) in infants [2]. These symptoms might develop right after birth or later in adolescence or early adulthood, when physical and hormonal changes occur. Symptoms may differ based on the type of heart disease and the location of the injury. [3]. The exact causes of congenital heart disease are mostly unclear, however hereditary disorders such as chromosomal disorders, maternal diabetes, smoking during pregnancy, influenza during pregnancy, Rubella infections in the first three months of pregnancy, and use of certain medicines during pregnancy are prevalent. Congenital heart disease is identified by a range of diagnostic methods, including cardiac catheterization, electrocardiograms, echocardiograms, chest x-rays, pulse oximetry, and heart magnetic resonance imaging. [4,5]. How congenital cardiac issues are addressed depends on their severity and type. Certain congenital cardiac problems don't have a major influence on the child's life or go away on their own as the baby grows. On the other hand, with a lifetime of expert evaluation, more serious cardiac issues are treated with medicine, surgery, or a heart transplant [6].

2. Aim of the Study

To assess the patterns and risk factors of congenital heart disease among children under five years in pediatric teaching hospitals at Mosul city.

3. Objectives

1. To assess the prevalence of congenital cardiac disease in children under five years of age within the pediatric educational hospitals of Mosul.
2.To identify the risk variables linked to congenital heart disease in infants under five years of age in pediatric teaching institutions in Mosul.

4. Methodology

Study Design: -

The study used a quantitative descriptive, case-control study design was utilized to achieve the aim and objectives of the study.

Setting of the Study: -

A descriptive study was carried out at Ibn Al-Atheer teaching hospital, Eco Unit, Al-Khansaa teaching hospital, Eco Unit and Mosul center for Cardiac Medicine and Surgery, advisory.

Sample of the Study: -

This study's target sample included all patients with congenital heart disease admitted to the Ibn Al-Atheer teaching hospital, the Al-Khansaa teaching hospital, and the Mosul Centre for Cardiac Medicine and Surgery, who were the same age or younger than five years. A non-probability purposive sample size (cases n=90) and another set of sex and age-matched children who were healthy and attending these hospitals for other reasons, were considered as control (control n=90) at the time of data collection (10th April 2023 to 10th Oct. 2023).

5. Results

Table 3.1 Demographic characteristics of the whole sample

Variables	Case Group No=90		Control Group No=90	
1) Gender	***No.***	***%***	***No.***	***%***
Male	49	54.4	49	54.4
Female	41	45.6	41	45.6
Total	**90**	**%100**	**90**	**%100**
2) Age of child	***No.***	***%***	***No.***	***%***
Less than two years	68	75.6	68	75.6
2-5 years	22	24.4	22	24.4
Total	**90**	**%100**	**90**	**%100**
3) Birthweight	***No.***	***%***	***No.***	***%***
<2500g	31	34.4	26	28.9
2500-3500g	43	47.8	52	57.8
> 3500g	16	17.8	12	13.3
Total	**90**	**%100**	**90**	**%100**
4) Maternal age at conception	***No.***	***%***	***No.***	***%***
Less than 20 years	45	50.0	37	41.1
20 years and more	45	50.0	53	58.9
Total	**90**	**%100**	**90**	**%100**
5) Family history of CHD	***No.***	***%***	***No.***	***%***
Yes	22	24.4	10	11.1
No	68	75.6	80	88.9
Total	**90**	**%100**	**90**	**%100**
6) Child born at term	***No.***	***%***	***No.***	***%***
Yes	66	73.3	78	86.7
No	24	26.7	12	13.3
Total	**90**	**%100**	**90**	**%100**

Table 3-1 shows the demographic characteristics of the study and the control group according to their gender: The current study results showed that the percentage of men in the sample of the study was 54.4%, which is the same as the percentage of men in the control group.

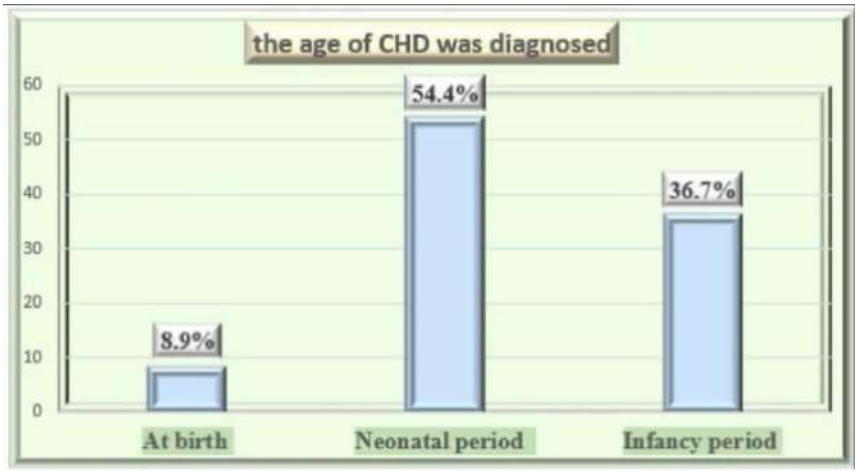

Figure 3-1 Distribution of the children in the study according to their congenital heart disease was diagnosed

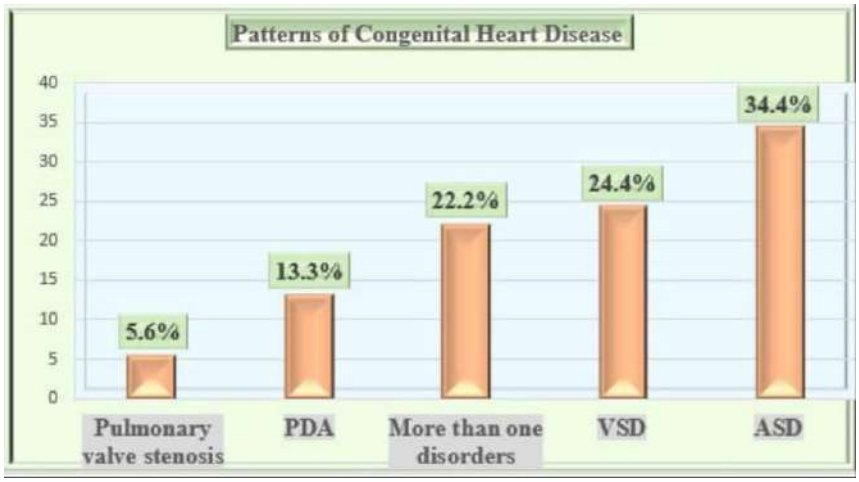

Figure 3-2 Distribution of the children in the study according to their patterns of congenital heart disease

Table 3-2 Factors associated with congenital heart disease of the whole sample

Independent variables	Case Group No=90		Control Group No=90	
	No.	%	No.	%
The pregnancy was multifetal gestation				
Yes	5	5.6	11	12.2
No	85	94.4	79	87.8
Total	**90**	**%100**	**90**	**%100**
The mother smoked during pregnancy				
Yes	6	6.7	5	5.6
No	84	93.3	85	94.4
Total	**90**	**%100**	**90**	**%100**
Did the mother suffer from any health problems during pregnancy?				
Yes	86	95.6	78	86.7
No	4	4.4	12	13.3
Total	**90**	**%100**	**90**	**%100**
The mother had any health conditions during pregnancy				
Yes	56	62.2 *	40	44.4
No	34	37.8	50	55.6
Total	**90**	**%100**	**90**	**%100**
Family history of CHD				
Yes	22	24.4 *	10	11.1
No	68	75.6	80	88.9
Total	**90**	**%100**	**90**	**%100**
Child born at term				
Yes	66	73.3	78	86.7
No	24	26.7 *	12	13.3
Total	**90**	**%100**	**90**	**%100**

* The variable was more affected on the present study.

Table 3-3 The association between in dependent variables and congenital heart disease of the whole sample

CHD / Socio-demographic characteristics	In dependent Variables	Total N0.	With CHD (Dependent Variable)				
			Case	Control	Chi-square		Odds ratio value (at 95% CI)
			N0	N0	X^2	P-value	
Birth weight	<2500g		31	26	1.311	.860 N. Sig	1.442
	2500-3500g		43	52			
	> 3500g		16	12			
Family history of CHD	Yes		22	10	1.271	.057 Sig	.312 (.037-2.614)
	No		68	80			
Maternal age at conception	Less than 20 years		45	37	.831	.046 Sig	1.096 (.473-2.539)
	20 years and more		45	53			
Child born at term	Yes		66	78	.315	0.013 H. Sig	1.450 (.394-5.339)
	No		24	12			
health conditions during pregnancy	Yes		56	40	.207	0.148 Sig	.575 (.243- 1.360)
	No		34	50			

N. Sig not significant.
Sig significant.
H. Sig high significant.

The Chi-square analysis test was conducted to examine the relationship between dependent variables such as birth weight, family history of HDD, maternal age at conception and child born at conception) and congenital heart disease.

6. Discussion

The results of the current study summarized that congenital heart defects and malformations causing cyanosis represented the most common diagnoses of congenital heart defects, with the remaining cases also causing cyanosis. This is similar to the study with Ecori. et al. (2018) and Abdel Rahman and Diab (2022), Some researchers have noted that diseases that cause bluish coronary arteries are the most common diseases that cause congenital heart defects, and that there are similar results due to bacteria. Jasim et al. (2017) and Kshirsagar et al. (2020). This demonstrated that the less complex congenital heart defect conditions were more common in children under five than the more complex ones.

Results that have shown that diseases that cause cyanosis in children, which include stenosis of the pulmonary valve and arterial tube. As well as ventricular septal defects, atrial septal defects, Coronary heart disease is the most commonly detected. These studies showed that the most common diseases are blood vessel transposition and quadruple cardiac bypass. This demonstrates the variety of CHDs identified in research participants, with congenital cyanotic heart disease being the most prevalent. According to Namuyonga et al. (2020), the most prevalent HSD diagnoses in children under five are atrial septal defect, ventricular septal defect, and patent ductus arteriosus.

Same results foe study of Abdurrahman and Diab. (2022) and Thomford et al. (2020 A study

conducted in Sudan and Ghana found that the most common congenital heart defects in children are tetralogy of Fallot, major vessel transposition, ventricular septal defect, and atrial septal defect.

A study discovered that maternal problems during pregnancy, such as diabetes, high blood pressure, German measles, and inflammatory infections, all of these problems affect the deformities that occur in newborns, and they were highly statistically significant.

The study results also discovered that while the majority of babies in both the study and control groups were born before their scheduled dates, the proportion of premature babies in the study group was higher than the proportion of the control group. Furthermore, this study found a statistically significant association (chi-square = 0.315, p = 0.013) between childhood pregnancies and coronary heart disease. Research conducted by Kabakasi and associates (2021), Liu and associates (2019).

7. Conclusion

According to the results of this study, the researchers concluded that there is an increase in congenital heart diseases in children during the last five years for newborns and 5-year-olds, especially diseases that cause cyanosis and arterial diseases, compared to older children. and pulmonary valve stenosis, while tetralogy of Fallot and great vessel transposition were part of the coronary heart disease category.

8. Recommendations

The study recommends:

1. Evaluation and Classification and evaluation of factors related to risk factors for congenital heart diseases in Mosul City Teaching Hospital

2. Educating nurses to improve and diagnose congenital heart defects and provide good and correct care for children with these diseases.

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